

New Castle Town Beach, New Castle

BEACH WATER QUALITY REPORT SUMMER 2004



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BACKGROUND

The New Hampshire Department of Environmental Services (NHDES) has operated its Public Beach Inspection Program, or Beach Program, for over twenty years. Coastal beach monitoring began in 1989 and has continued through the present. NHDES recognizes the threat to public health at public beaches and continues to monitor public beaches throughout the state for the presence of pathogenic organisms. Coastal beaches are monitored for the presence of the fecal bacteria *Enterococci*. These fecal bacteria are present in the intestines of warm-blooded animals including humans. Fecal bacteria, when present in high concentrations and ingested, can commonly cause gastrointestinal illnesses such as nausea, vomiting and diarrhea. They are also known as indicator organisms, meaning their presence in water may indicate the presence of other potentially pathogenic organisms.

In October of 2000, the United States Environmental Protection Agency (EPA) signed into law the Beaches Environmental Assessment and Coastal Health (BEACH) Act. The BEACH Act is an amendment to the Clean Water Act that authorizes the EPA to award grants to eligible states. The purpose of the BEACH Act is to reduce the risk of disease to users of the nation's recreational waters. BEACH Act grants provide support for development and implementation of monitoring and notification programs that help protect the public from exposure to pathogenic microorganisms in coastal recreation waters.

NHDES received grant funding in 2002 to develop and implement a beach monitoring and notification program consistent with EPA's performance criteria requirements published in the *National Beach Guidance and Required Performance Criteria for Grants* document (www.epa.gov/waterscience/beaches/grants). NHDES has successfully met all requirements and continues to expand the monitoring and notification program. In 2002, only 9 coastal beaches were monitored, in 2003 fifteen coastal beaches and in 2004 sixteen coastal beach were monitored on a routine basis.

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Beach Description

New Castle Town Beach is a soft sand beach. Its total length is 840 feet. The beach is frequently used by residents and vacationers for various recreational activities. There are two access points to the beach area from the town park and from a nearby parking lot. The beach is only one attraction at New Castle Common. A large picnic and playground area are present and attract families and group outings to the area. Lifeguards are not present and sanitary facilities are available during the summer.

Waterfowl have been observed at the beach, although generally few in number. The most commonly seen are gulls. There are restrictions for dogs on the beach. During an April visit to the beach, biologists observed hundreds of small fish making their way towards the ocean from Bull Toad Pond.

Below is a brief description of the sampling stations at New Castle Town Beach, New Castle. All stations are accessed via the New Castle Common off Route 1B. These stations are pictured in Figure 1.

- The left sample station is located in front of a wood clapboard house near the north end of the beach.
- The center sample station is located between a gulley and a brown house with a chimney and sun room.
- The right sample station is located in front of the first pine tree on the left as you enter the beach area from the park.
- The pipe sample is located just across a berm from New Castle Town Beach. It can be accessed from New Castle Town Beach or from Ocean Drive off of Route 1B.

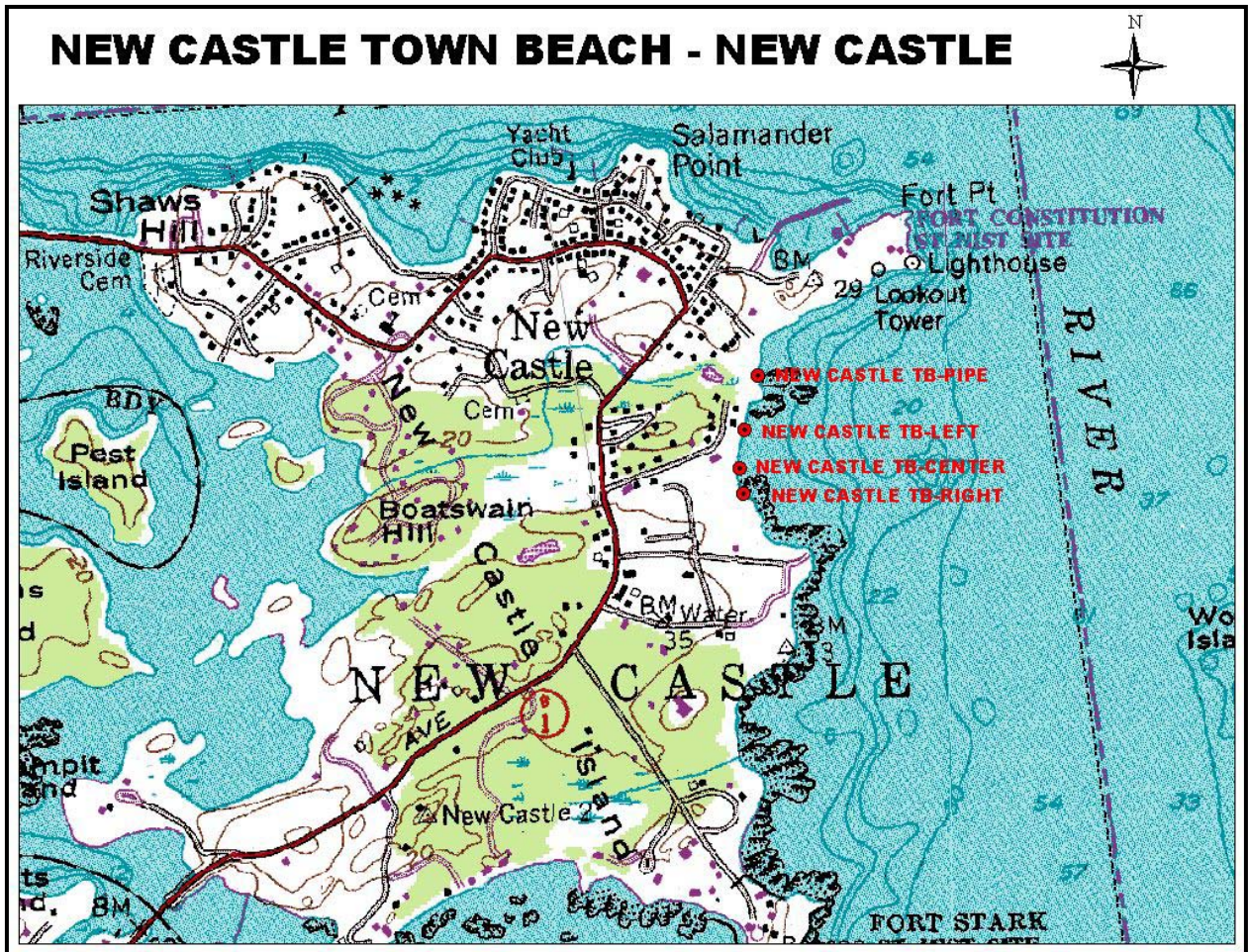


Figure 1. Map of New Castle Beach

Tier Status and Sampling Frequency

The Beach Program developed a risk-based beach evaluation process and tiered monitoring approach and implemented this approach during the 2003 beach season. Beach evaluations are conducted annually to determine potential health threats to the public. Evaluations are based on several criteria in three main categories: beach history, microbial pathogen sources, and beach use. Based on these criteria, beaches are assigned either a Tier I or Tier II status. Tier I are high priority beaches that have an increased potential to affect public health while Tier II are low priority beaches that have less potential to affect public health. Beach sample frequency is based on the Tier statuses; Tier I beaches are sampled weekly and Tier II beaches are sampled every other week.

New Castle Town Beach was categorized as a Tier I beach based on the Beach Program's Risk-Based Evaluation ranking system. This ranking indicates that the beach is frequently used by the public but there are potential pollution sources present that may negatively affect public health. The New Castle Town Beach Tier I ranking has not changed since the ranking system was implemented.

Water Quality

Beaches are monitored to ensure compliance with State Water Quality Standards. Marine waters are analyzed for the presence of the fecal bacteria *Enterococci*. *Enterococci* are known as indicator organisms, meaning their presence may indicate the presence of pathogenic bacteria. The state standard for *Enterococci* at public beaches is 104 counts/100 mL in one sample, or a geometric mean of 35 counts/100 mL in three samples collected over sixty days. Standard exceedances require the issuance and posting of a beach advisory. Beach advisories remain in effect until subsequent beach sampling indicates safe water quality conditions.

The number of samples collected at each beach is determined by the beach length. Beaches less than 100 feet in length are sampled at left and right locations 1/3 of the distance from either end of the beach. Beaches greater than 100 feet in length are bracketed into thirds and sampled at left, center and right locations. Routine sample collection may be enhanced by sampling known or suspected pollution sources to the beach area. Also, storm event sampling may be conducted at beaches where wet-weather events are expected to affect beach water quality.

The 2004 sampling season began June 1st. June was cooler and drier than normal, July was cooler and wetter than normal, while August was warmer and wetter than normal. The sampling season encompassed 108 days, of which precipitation was recorded on 42 days (based on Seabrook WWTF recorded precipitation). Twenty beach days (normal beach hours are considered 9:00 a.m. to 5:00 p.m.) were directly affected by precipitation.

New Castle Town Beach was sampled during the pre-season and once per week from June 1st through Labor Day. There were a total of 16 routine inspections performed and 48 samples collected in 2004. Three pre-season inspections were also performed at the beach. Samples were collected at three beach stations and also at a pipe that discharges outside of the beach area (Figure 1).

Table 1 includes *Enterococci* data from each sampling event in 2004. Overall, the *Enterococci* levels were low. No bacteria advisories were issued in 2004, however, bacteria levels exceeded the state standard on six occasions (Figure 2). The Beach Program posts beach advisories if bacteria levels exceed the state standard at two sample locations on the same day, or if they exceed the state standard at one sample location by greater than 70 counts/100 mL. *Enterococci* levels did not exceed the state standard at two sample stations nor did they exceed the state standard by greater than 70 counts/100 mL. The one exception being on August 31, 2004 when the right sample station had a result of 240 counts/100 mL. Since the beach season ends on Labor Day and children were already in school by August 31, 2004, the Beach Program did not feel it was necessary to post the bacteria advisory. Immediate re-sampling was performed and *Enterococci* levels had fallen back to very low levels.

There is no direct evidence as to what caused the elevated *Enterococci* levels. The right sample station was plagued by elevated levels during July. The right station tends to be more turbid than the rest of the beach area, potentially due to the lack of open-ocean flushing. Also, children tend to congregate and play in the water at the right side of the beach. These two actions combined could stir up the sediments. Bacteria persist in sediment and when disturbed could disperse into the water column.

Table 1. New Castle Town Beach Enterococci Data 2004

Sample Date	Station Name	Results (counts per 100 mL)
04/15/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	<10
06/02/2004	New Castle TB – Left	70
	New Castle TB – Center	60
	New Castle TB – Right	130
06/08/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	5
06/16/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	<10
06/22/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	5
06/30/2004	New Castle TB – Left	10
	New Castle TB – Center	160
	New Castle TB – Right	<10
07/02/2004	New Castle TB – Left	20
	New Castle TB – Center	10
	New Castle TB – Right	120
07/06/2004	New Castle TB – Left	10
	New Castle TB – Center	<10
	New Castle TB – Right	120
07/08/2004	New Castle TB – Left	40
	New Castle TB – Center	40
	New Castle TB – Right	20
07/12/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	<10
07/20/2004	New Castle TB – Left	<10
	New Castle TB – Center	10
	New Castle TB – Right	140
07/22/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	40
07/28/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	<10

Table 1 continued on next page

Sample Date	Station Name	Results (counts per 100 mL)
08/02/2004	New Castle TB – Left	<5
	New Castle TB – Center	<10
	New Castle TB – Right	5
08/11/2004	New Castle TB – Left	<10
	New Castle TB – Center	10
	New Castle TB – Right	<10
08/16/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	50
08/24/2004	New Castle TB – Left	<10
	New Castle TB – Center	<10
	New Castle TB – Right	<5
08/31/2004	New Castle TB – Left	30
	New Castle TB – Center	20
	New Castle TB – Right	240
09/02/2004	New Castle TB – Left	<10
	New Castle TB – Center	10
	New Castle TB – Right	<5

Table 2 includes Enterococci data from samples collected at a pipe that discharges to a small area beyond the north end of New Castle Town Beach. The pipe drains Little Harbor through a system of wetlands that traverse the island from West to East ending in a small pond. Figure 3 depicts the pipe Enterococci data over the course of the 2003 and 2004 beach seasons. Samples were collected only when sufficient flow for clean sample collection occurred. Otherwise, flow was too low for sample collection or the pipe was closed. Pipe bacteria levels were elevated on several occasions in 2003 and 2004. Potential sources could be natural wetland discharges or a failing septic system.

Table 2. New Castle Town Beach Pipe Enterococci Data 2004

Sample Date	Results (counts per 100 mL)
04/15/2004	230
05/11/2004	60
07/06/2004	650
07/20/2004	190

Figure 2 depicts New Castle Town Beach Enterococci data relative to the state standard for coastal beaches.

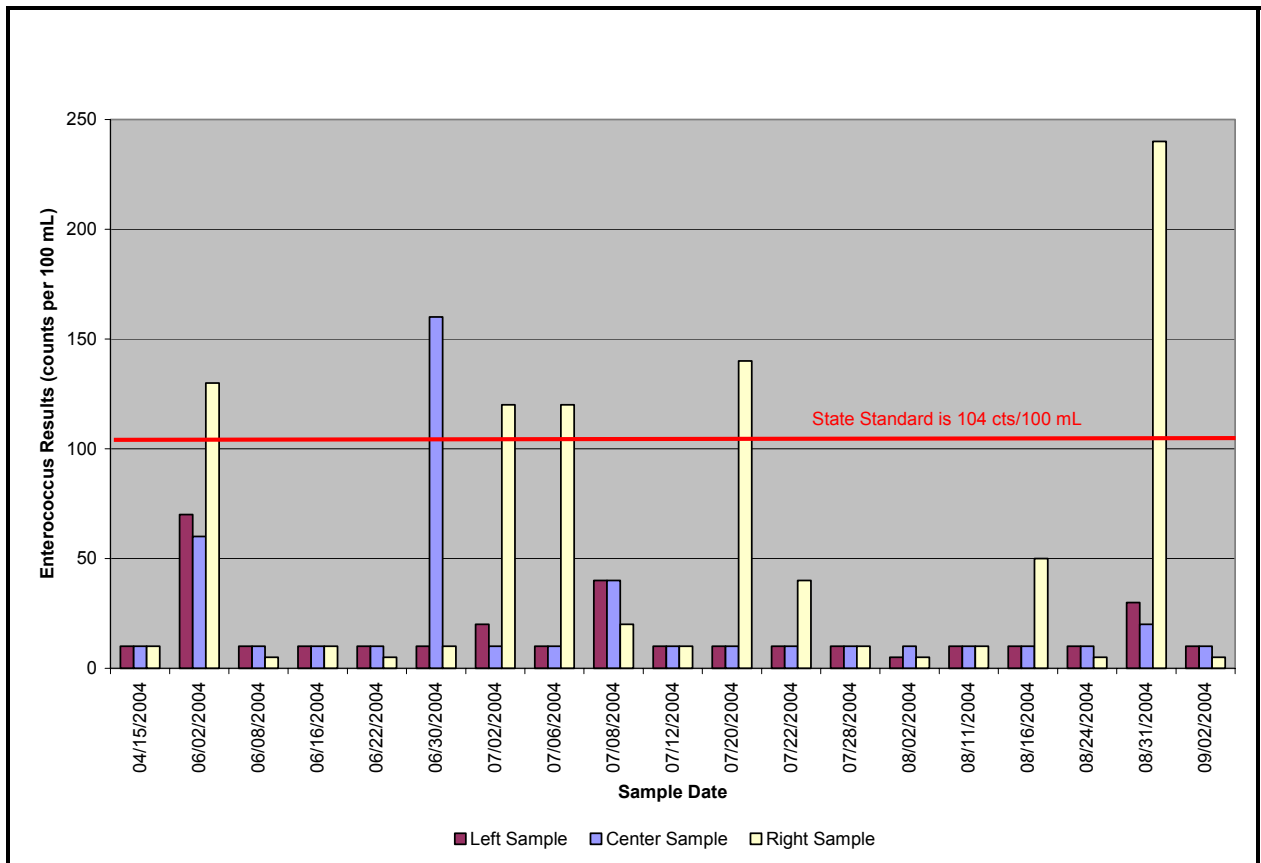


Figure 2. New Castle Town Beach Enterococci Data 2004

Figure 3 depicts the Enterococci data collected from a pipe discharging beyond the left end of the beach area.

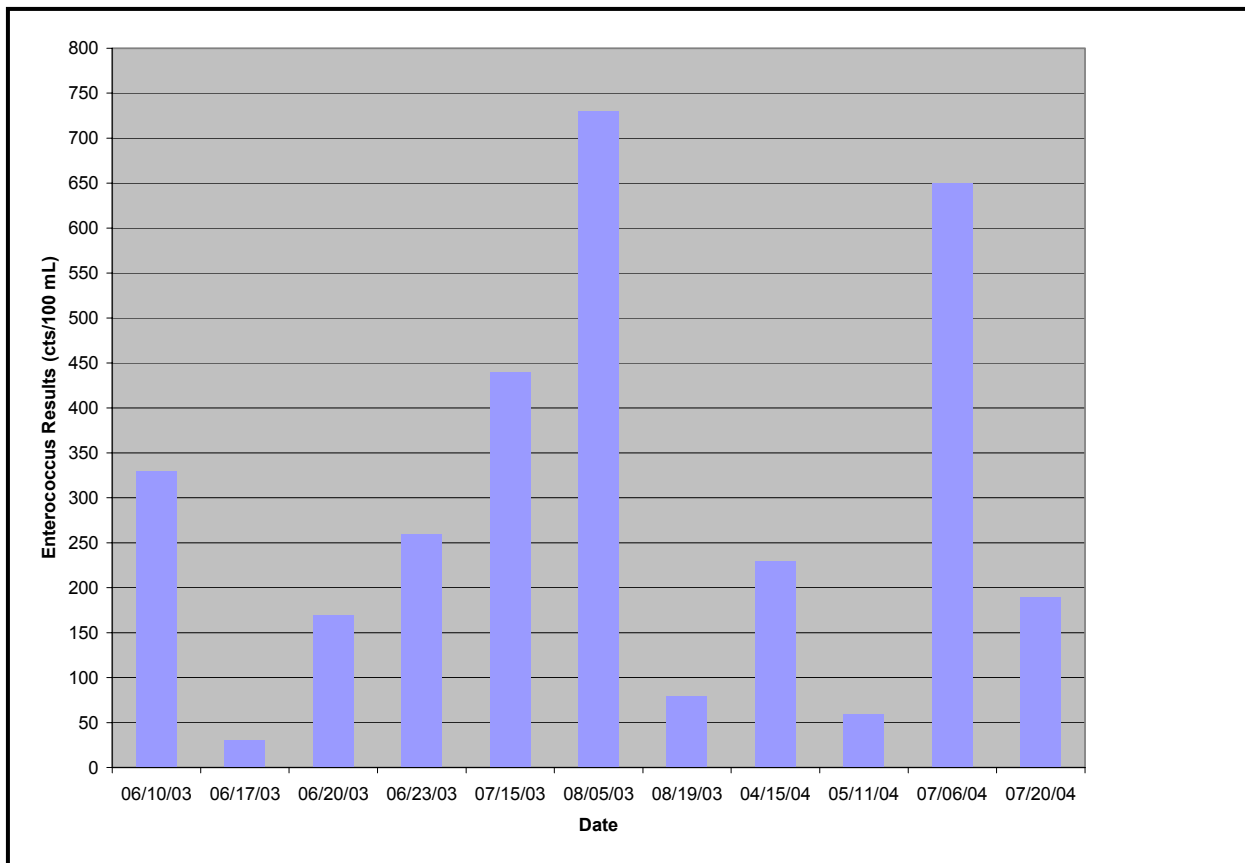


Figure 3. New Castle Pipe Enterococci Data 2003 and 2004

The Beach Program staff analyzed whether a relationship exists between elevated Enterococci levels and precipitation. Analyses of the data indicate no direct correlation. DES will continue to monitor precipitation data and Enterococci levels. Precipitation often causes elevated bacteria levels due to runoff in the watershed.

Areas of Concern

Bull Toad Pond located at New Castle Common is scheduled to undergo restoration activities. Several groups are involved in the project, including New Hampshire Coastal Program, Town of New Castle and New Castle Conservation Commission. The pond is located west of the New Castle Town Beach area and, when the water level is high, the pond drains between the right and center station of the beach. The site was assessed in 2004 and results indicated that the surface water was not contaminated. However, the sediments contained polyaromatic hydrocarbons (PAHs) and asbestos above standard levels. Restoration activities at this site could include

clearing unwanted vegetation, removing surface debris of extruding hazards, and covering the area with clean fill. These activities will be monitored by DES as several permits may be required.

Bacteria levels discharging from the pipe at New Castle Common are a concern (Figure 3). Samples were analyzed for Enterococci bacteria. The geometric mean for the 2003 Enterococci data was 176 cts/100 mL and for 2004 was 203 cts/100 mL. Enterococci levels exceeded the beach standard (104 counts/100 mL) on several occasions in 2003 and 2004.

These bacteria levels indicate that fecal pollution is a problem and is a public health threat at this site. Beach Program personnel plan to conduct an intensified sampling regime at the pipe discharge and upstream waters. The sampling plan will likely consist of a microbial source tracking study to specifically identify the sources of bacteria as waterfowl, human, wildlife, or domestic animal. Once the sources are identified, remediation efforts will likely take place to reduce bacteria loading from the pipe.

Thoughts for the Future

- The Town of New Castle, local businesses, or school groups should consider joining NHDES' Adopt-a-Beach Program. The program would consist of beach clean-ups and water quality monitoring. DES would conduct training sessions and participate in education and outreach activities for the community. If you are interested, please contact Sara Sumner at 603-271-8803 or ssumner@des.state.nh.us.